

in débris of Davidson River, under stones, and under a mossy rock wet with spring water. 100+ specimens.

Gastrodonta interna (Say). Pink Beds, Rich Mountain, Bennett Gap Road. In rotten stump, in charred wood, among chips. 10 specimens.

Gastrodonta gularis (Say). Pigeon Gap Trail, Bennett Gap Road, Asheville Road at about 4000 ft. altitude, Rich Mountain, Pink Beds. Under stones beside a spring, under logs and stones, in forest débris. 13 specimens.

Gastrodonta intertexta (W. G. Binney). Rich Mountain, Bennett Gap Road. In decaying wood (beech and birch), and in forest débris. 4 specimens.

Helicodiscus fimbriatus? Wetherby. Rich Mountain. Under an old oak log. Two imperfect specimens, not fully grown.

Philomyces carolinianus (Bosc.). Bennett Gap Road, near Avery Creek, Pink Beds, Rich Mountain, Pigeon Gap Trail. Under a stone near the road, on a stone at a spring, under boards and beech and oak logs, under moss and bark of stumps and trees, under mossy rock, on saw-dust heap. 16 specimens.

NOTES ON THE GENUS *ACTEOCINA*, GRAY.

BY A. M. STRONG.

Dr. Dall in his new "Summary of Marine Shell-bearing Mollusks of the Northwest Coast of America" (Bull. U. S. Nat. Mus., No. 112, p. 61) lists seven species of the Genus *Acteocina* (formerly known as *Tornatina*), described by the early workers on West Coast shells, and adds one new species. The ranges given in the Bulletin would seem to add confusion to an already badly confused situation. The following table shows the ranges given by the different authors:

<i>Acteocina</i>	Dall ¹	Gould ²	Cooper ³	Arnold ⁴	Pilsbry ⁵
<i>A. culcitella</i> Gld.	Kodiak Island to Puget Sound	Santa Barbara (Col. Jewett)	Monterey to San Diego	Living Monterey to San Diego	Santa Barbara San Pedro
<i>A. cerealis</i> Gld.	(<i>A. culcitella</i> , Junior)	Santa Barbara (Col. Jewett)	Monterey to San Diego	Living Monterey to San Diego	Vancouver to San Diego
<i>A. eximia</i> Bd.	Kodiak Island to Puget Sound	. . .	. . .	Living Vancouver to San Diego	Vancouver Island
<i>A. inculta</i> Gld.	Monterey to Gulf of Calif.	San Diego	San Diego	. . .	San Diego Monterey
<i>A. infrequens</i> C. B. Ad.	Santa Monica, Cal. to Panama	. . .	. . .	. . .	Panama Mazatlan
<i>A. carinata</i> Cpr.	San Diego to Gulf of Calif.	. . .	. . .	. . .	Mazatlan San Diego
<i>A. planata</i> Cpr.	San Diego	. . .	. . .	. . .	. . .
<i>A. smirna</i> Dall.	San Diego to San Salvador	. . .	. . .	. . .	. . .

To this should be added Packard's Molluscan Fauna from San Francisco Bay (Univ. of Cal. Pub., Vol. 14, 1918, p. 345), in which *A. cerealis* Gould is listed and the statement made that this is the furthest north that this southern species has been found. Also Zetek's late list of Panama Shells (La Revista Nueva, Tomo V, p. 521) in which *A. carinata* Cpr. is the only member of the genus given.

Most if not all of the species given in this genus are found living on the bottom of shallow bays. It does not seem possible that the different species could have the extreme ranges indicated by the different authors. In citing localities they have quoted largely from other writers, and the correctness

¹ List of West Coast Shells, Bull. U. S. Nat. Mus., No. 112, pp. 61-202.

² Otia conchologica, pp. 184-185.

³ Catalogue of West North American Shells, Bull. Cal. State Min. Bur.

⁴ Paleontology of San Pedro, Memoirs Cal. Acad. of Sci., Vol. 3, p. 189.

⁵ Manual of Conchology, Vol. 15, p. 187.

of the range depends largely on the accuracy with which the identifications were made. The type localities give an idea of the probable range. They are given as follows:

<i>A. eximia</i> (Baird),	Vancouver Island
<i>A. culcitella</i> (Gould),	Santa Barbara
<i>A. cerealis</i> (Gould),	Santa Barbara
<i>A. inculta</i> (Gould),	San Diego
<i>A. planata</i> (Cpr.),	San Diego
<i>A. smirna</i> Dall,	San Diego
<i>A. carinata</i> (Cpr.),	Mazatlan
<i>A. infrequens</i> (C. B. Ad.),	Panama

It does not seem reasonable that *A. culticella* Gould would be found at Kodiak Island in the Arctics, or that *A. infrequens* C. B. Ad. would be found at Santa Monica, California. *A. carinata* Cpr. looks equally out of place in Zetek's list.

All these species are comparatively little known, and the differences seem to be small. The confusion in range would seem most probably to be caused by a failure to secure a correct identification. The following comparative notes are taken from the above listed authors:

Gould. *Bulla* (*Akera*) *culcitella*. "*B. tenuis* Adams is the only species approaching this. Some of its characters bring it close in alliance with the genus *Tornatina*."

Bulla (*Tornatina*) *cerealis*. "In form and size it is scarcely to be distinguished from *B. gracilis* A. Ad., which is transversely striated. In terms, it agrees with *B. infrequens* C. B. Ad., but Prof. Adams himself considers it a different species."

Arnold. *Tornatina cerealis* Gld. "Distinguished from *T. culcitella* by more angular whorls, mammillated apex, more keeled upper edge of whorl and smaller size."

Tornatina eximia Baird. "Resembles *T. culcitella*, but has a whorl narrowed anteriorly, a spire depressed nearly to the rim of the body whorl, a nar-

rower aperture and less prominent plait on columella."

Pilsbry. *Tornatina carinata* Cpr. "Resembles *T. infrequens* C. B. Ad. more than *T. cerealis* Gld."

These notes would indicate a close similarity between at least several of the species, but a distinction between *culcitella* and *cerealis* which would make Dr. Dall's statement that the latter is a junior form of the former to seem very doubtful.

One species of *Acteocina* is occasionally found on the mud flats of southern California bays in considerable numbers. The shells average about 4 mm in length and are of the characteristic shape of the genus, but the rather flat apex is always more or less eroded and pitted. These have been identified as *A. inculta* Gld. The description of this species calls for an ivory-white shell. As found by the writer, they are colored to varying extents with a brownish ferruginous stain. These are found traveling just under the surface of the mud and their presence is shown by a trail very similar to that of a small *Olivella*. Like the *Olivellas*, a large number are always found traveling together.

Associated with the last few specimens of a quite different and slightly larger species are sometimes found. Under a hand-glass the brownish surface is seen to be covered with very fine, slightly undulating spiral lines. The shoulders of the whorls are sharply keeled, so that in looking down on the apex the suture has the appearance of a deep spiral groove. The shores of a large tide pool just inside the entrance to Newport Bay has furnished Southern California collectors with a considerable number of specimens of a large *Acteocina* which has always been classed as *A. culcitella* Gld. These vary from 10 to 20 mm. in length but otherwise are very similar to the previously mentioned form. The microscopic brown spiral lines are quite distinct on the under side of the shell next to the aperture, but on the opposite side are very faint, leaving the shell almost white. It is quite probable that the color has been worn off the portion of the shell which is not protected by the mantle of the animal when burrowing

through the mud and sand. This may be the adult of the preceding, and the identification is not at all certain.

These notes are not written in the hopes of straightening out the seeming tangle in the ranges and identification of the different species of the genus *Acteocina*, but only to call attention to the matter. A careful comparison of the type specimens with specimens from all along the coast will be required to form any definite conclusion. It is hoped that others will be able to throw more light on the subject.

**LAND SHELLS FROM PALM CANYON, CALIFORNIA, AND THE
GRAND CANYON.**

BY H. A. PILSBRY.

Dr. C. Montague Cooke and his son C. M. Cooke 3d, collected shells, as occasion offered, while en route westward in June, among them the following:

Micrarionta wolcottiana (Bartsch). Palm Canyon, Riverside Co., California. "Found under dead plants of one species of low-growing cactus at the mouth of the canyon, about 6 miles above Palm Springs." Small specimens, 15.5 to 21 mm. diameter, only one out of 13 exceeding 19 mm.

Sonorella coloradoensis (Stearns). Bright Angel Trail, Grand Canyon. Small, 15.3 mm. diam., like the Bass' Trail specimens.

Oreohelix s. depressa (Ckll.). "Collected along the Bright Angel Trail, from about 1000 to 3400 ft. below the rim. I found the first specimen very close to the last pine on the trail, just below the foot of the high yellow cliffs. Dead specimens were seen along the trail to just below the part of the trail called Jacob's Ladder. Unfortunately, we were with a rather large party and I had a mule that wouldn't stop. I collected six specimens, which I am sending you, and saw 15 or 20 additional along the trail."

This species has been found high on the northern side of the Canyon, but not until now on the southern side.

Oreohelix yavapai angelica P. & F. About 50 ft. below the rim, Bright Angel Trail, at "Hermit's Rest".